The invention claimed is:

1. An analytical furnace comprising:

a furnace having a heating element;

a control circuit for controlling the application of power to said heating element;

a first temperature sensor positioned in fixed relationship within said furnace for detecting the furnace temperature at said fixed location;

a second temperature sensor removably positionable within a crucible positioned in operative relationship within said furnace; and

wherein said control circuit includes a temperature modeling cycle for correlating the temperature between said first and second temperature sensors during a cycle of furnace temperature steps and developing in response thereto optimum temperature control signals for increasing crucible temperatures to desired temperature levels.

2. The furnace as defined in claim 1 wherein said control circuit includes a processor which is programmed to measure temperatures from said first temperature sensor and said second temperature sensor and model the crucible temperature profile as a function of detected temperatures using a proportional, integral, and derivative (PID) process applied to temperature data obtained from said sensors.

3. The furnace as defined in claim 2 wherein said computer sequentially increases the temperature of the furnace through a plurality of temperature plateaus and determines PID data for each plateau.

4. The furnace as defined in claim 3 wherein said modeling data is further determined using an auto-regressive moving average approximation.

5. A thermogravametric analyzer comprising:

a furnace having a heating element;

first and second temperature sensors; and

a control circuit for controlling the application of power to said heating element, wherein said control circuit includes a processor which is programmed to measure the temperatures from a first temperature sensor positioned in fixed relationship within said furnace for detecting the furnace temperature at said fixed location and a second temperature sensor removably positionable within a crucible positioned in operative relationship within said furnace, and modeling using a proportional, integral, and derivative (PID) process applied to temperature data obtained therefrom, the crucible temperature profile as a function of detected furnace temperatures.

6. The furnace as defined in claim 5 wherein said computer sequentially increases the temperature of the furnace through a plurality of temperature plateaus and determines PID data for each plateau.

7. The furnace as defined in claim 6 wherein modeling data is further determined using an auto-regressive moving average approximation.

8. A thermogravametric analyzer comprising:

a furnace;

a balance with a weigh platform positioned within said furnace;

a support for a plurality of crucibles which support sequentially positions crucibles on the weigh platform;

a heater for heating the furnace;

a pair of temperature sensors including a first temperature sensor positioned in fixed relationship within said furnace and a second temperature sensor movable to be positioned within a crucible on said support; and

a control circuit coupled to said temperature sensors, said circuit including a processor programmed to obtain temperature data to model the crucible temperature as the furnace temperature is varied and to subsequently control the furnace temperature during operation.

9. The analyzer as defined in claim 8 wherein said processor is programmed to measure temperatures from said first temperature sensor and said second temperature sensor and model the crucible temperature profile as a function of detected temperatures using a proportional, integral, and derivative (PID) process applied to temperature data obtained from said sensors.

10. The analyzer as defined in claim 9 wherein said computer sequentially increases the temperature of the furnace through a plurality of temperature plateaus and determines PID data for each plateau.

11. The analyzer as defined in claim 10 wherein modeling data is further determined using an auto-regressive moving average approximation.

12. A process of modeling the temperature of a crucible in an analytical furnace comprising the steps of:

detecting the furnace temperature from a temperature sensor fixed in the furnace;

detecting a crucible temperature from a movable temperature sensor placed in a crucible;

increasing the furnace temperature to a target level while monitoring the detected furnace and crucible temperatures;

correlating the detected temperature using a proportional, integral, and derivative technique to predict when the crucible temperature will reach the target level; and

storing and utilizing the data to model the crucible temperature profile as a function of furnace temperature to control the furnace during an analysis.

13. The process as defined in claim 12 wherein the correlating step is repeated until the crucible temperature has exceeded the target temperature.

14. The process as defined in claim 13 wherein the furnace temperature is increased to a plurality of target levels.

15. A thermogravametric analyzer comprising:

a furnace having a heating element;

a control circuit for controlling the application of power to said heating element;

a first temperature sensor positioned in fixed relationship within said furnace for detecting the furnace temperature at said fixed location;

a second temperature sensor removably positionable within a crucible positioned in operative relationship within said furnace; and

wherein said control circuit includes a temperature modeling cycle for correlating the temperature between said first and second temperature sensors during a cycle of furnace temperature steps and developing in response thereto optimum temperature control signals for raising crucible temperatures to desired temperature levels.

16. The analyzer as defined in claim 15 wherein said control circuit includes a processor which is programmed to measure temperatures from said first temperature sensor and said second temperature sensor and model the crucible temperature profile as a function of detected temperatures using a proportional, integral, and derivative (PID) process applied to temperature data obtained from said sensors.

17. The analyzer as defined in claim 16 wherein said computer sequentially increases the temperature of the furnace through a plurality of temperature plateaus and determines PID data for each plateau.

18. The analyzer as defined in claim 17 wherein modeling data is further determined using an auto-regressive moving average approximation.

19. A thermogravametric analyzer comprising:

a furnace having a heating element; and

a control circuit for controlling the application of power to said heating element, wherein said control circuit includes a processor which is programmed to measure the temperatures from a first temperature sensor positioned in fixed relationship at a fixed location

within said furnace for detecting the furnace temperature at said fixed location and a second temperature sensor removably positionable within a crucible positioned in operative relationship within said furnace, and modeling using a proportional, integral, and derivative (PID) process applied to temperature data obtained therefrom, the crucible temperature profile as a function of detected furnace temperatures.

20. The analyzer as defined in claim 19 wherein said computer sequentially raises the temperature of the furnace through a plurality of temperature plateaus and determines PID data for each plateau.

21. The analyzer as defined in claim 20 wherein said modeling data is further determined using an auto-regressive moving average approximation.

22. A process of modeling the temperature of a crucible in a thermogravametric analyzer comprising the steps of:

detecting the temperature of a fixed temperature sensor in a furnace associated with the thermogravametric analyzer;

detecting the temperature using a movable temperature sensor placed in a crucible positioned in the furnace;

increasing the furnace temperature to a first target level while monitoring the detected furnace and crucible temperatures;

correlating the detected temperature using a proportional, integral, and derivative technique to predict when the crucible temperature will reach the target level; and

storing and utilizing the data to model the crucible temperature profile as a function of furnace temperature to control the furnace during an analysis.

23. The process as defined in claim 22 wherein the correlating step is repeated until the crucible temperature has exceeded the target temperature.

24. The process as defined in claim 23 wherein the furnace temperature is increased to a plurality of target levels.

25. An analytical furnace comprising:

a furnace having a heating element;

a control circuit for controlling the application of power to said heating element;

a first temperature sensor positioned in fixed relationship within said furnace for detecting the furnace temperature at said fixed location;

a second temperature sensor removably positionable within a crucible positioned in operative relationship within said furnace; and

wherein said control circuit correlates the temperature between said first and second temperature sensors during a cycle of operation of said furnace through increasing temperature steps to develop and store temperature control signals for controlling the application of power to said heating element.

26. The furnace as defined in claim 25 wherein said control circuit includes a processor which is programmed to measure temperatures from said first temperature sensor and said second temperature sensor and model the crucible temperature profile as a function of detected temperatures using a proportional, integral, and derivative (PID) process applied to temperature data obtained from said sensors.

27. The furnace as defined in claim 26 wherein said computer sequentially increases the temperature of the furnace through a plurality of temperature plateaus and determines PID data for each plateau.

28. The furnace as defined in claim 27 wherein said crucible temperature profile is further determined using an auto-regressive moving average approximation.